RXplore: New Regenstrief tool lets docs instantly track down drug reactions

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Jon D. Duke, M.D., is with the Regenstrief Institute and Indiana University School of Medicine. Credit: Jon D. Duke, M.D.

It's not uncommon for individuals to take as many as a dozen different prescriptions, each with its own set of possible side effects. If a patient experiences one of the potential hundreds of different adverse reactions such as nausea, headaches, insomnia or heart palpitations, how does the physician quickly and accurately determine which drug is the culprit?

Jon D. Duke, M.D., a medical informatics fellow at the Regenstrief Institute and the Indiana University School of Medicine, has created an easy-to-use graphical tool called RXplore which expedites tracking down the cause of drug side-effects. His work is published in the April 2010

issue of the *Journal of Biomedical Informatics*.

Currently doctors depend on knowledge of drug reactions acquired from past experience or by reviewing published prescribing information either online or in print. When evaluating multiple drugs the physician must look up each medication one at a time, a time-consuming process made more difficult by the dense and complex text found in typical drug labels.

RXplore solves this problem in a novel manner allowing physicians and other health-care providers to retrieve adverse reaction data for multiple medications simultaneously with an intuitive visual representation. An evaluation study showed that physicians are able to retrieve accurate side-effect information 65 percent faster using Rxplore than when using traditional drug information resources.

"Patients on complex drug regimens are doubly disadvantaged. They are at increased risk for an adverse event, yet their physician may be less likely to perform a thorough review of their medications due to the lengthy time required," said Dr. Duke.

He notes that he came up with the concept of visualizing Food and Drug Administration drug data but soon found that labels were inconsistent in how adverse events were reported. The greatest challenge of this project, according to Dr. Duke, was devising a system to represent such varied information in a consistent way.

How, for instance, can a "rare" occurrence and an "infrequent" one be compared? How do you contrast a numerical value - greater than three percent of patients have a certain side effect - to a phrase such as patients "sometimes" have this side effect?

"Once we had done the heavy lifting of building the framework and

models, we were able to develop the "eye candy" - the visualization that the doctor sees," he said.

With RXplore a physician can easily call up a visualization of the top 10 side effects of a specific drug or ask only for side effects relating to a particular specialty such as gastroenterology. Alternatively the doctor may request a snapshot of those drugs which cause a particular symptom, such as liver problems.

Answering such questions with RXplore took less than a minute and testers reported unanimously that they preferred the new tool to what they previously used to determine drug effects.

"Our next step is to begin gathering data on how the interactions of multiple medicines affect the likelihood of experiencing a side effect. This is not as simple as it sounds. If, for example, you take three drugs, each with a 4 percent risk of nausea, you don't have a 12 percent risk of nausea - it can be higher or lower. Genetics also come into play in considering the likelihood of a side effect, as do concurrent illnesses. When evaluating drug side-effects, we must begin thinking beyond individual medicines and consider a patient as a whole," says Dr. Duke.

Provided by Indiana University School of Medicine